

Islands Sea

under the

hard bottom invertebrates of the southeastern United States



Shallow water reef community at Gray's Reef National Marine Sanctuary (Photo by Greg McFall/Gray's Reef National Marine Sanctuary)

Most hard bottom habitats encountered on the inner shelf are small, isolated areas of rock outcroppings that are heavily encrusted with permanently attached marine invertebrates (animals without backbones). Storms and strong water currents can sometimes move layers of sand over areas of hard bottom, covering them temporarily. This means that these habitats are changeable, with waves of recolonization and dynamic patterns of habitat use by the reef community.

Blackfish Banks

The near shore hard bottom areas, often called "blackfish banks" are found in relatively shallow waters of 19-27 meters (62-88 ft). Small marine worms, amphipod crustaceans, bryozoans, hydroids and brittle stars typically dominate the invertebrate communities here; however sponges and octocorals usually contribute most of the biomass.



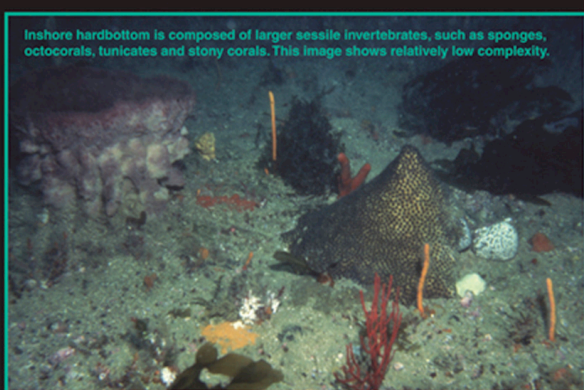
An ivory bush coral (*Oculina arbuscula*), a common benthic hard coral



The arrow crab (*Stenorhynchus seticornis*) perched atop a sea star



A seahorse crab (*Dissodactylus crinitellus*) living among the spines of the sand dollar (*Clypeaster subdepressus*)



Inshore hardbottom is composed of larger sessile invertebrates, such as sponges, octocorals, tunicates and stony corals. This image shows relatively low complexity.



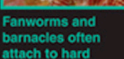
The common Atlantic slipper snail (*Crepidula fornicata*) is a common gastropod that forms colonies of individuals that stack upon one another, changing from male to female as they age.



A spotted porcelain crab (*Porcellana sayana*) on an anemone



A one-tooth simnia (*Simnialena uniplicata*), a mollusk commonly found on the sea whip (*Leptogorgia virgulata*)



Fanworms and barnacles often attach to hard substrates.

Dulichella sp., an amphipod found in shallow Atlantic coastal areas, is often associated with sponges. Mature males have a large claw that distinguishes them from the females.



Shelf Edge

The deeper hard bottom habitats are found at the edge of the continental shelf in depths of 55-100 m (180-328 ft). Worm and amphipod species different from those found in shallower waters generally dominate the fauna of this deep region, whereas sponges, octocorals, tunicates and echinoderms contribute the bulk of biomass.



Tube-building polychaete worms, sponges, octocorals and black corals can be seen in this image of the shelf edge reef.



pulchellus can be found attached to old coral rubble.



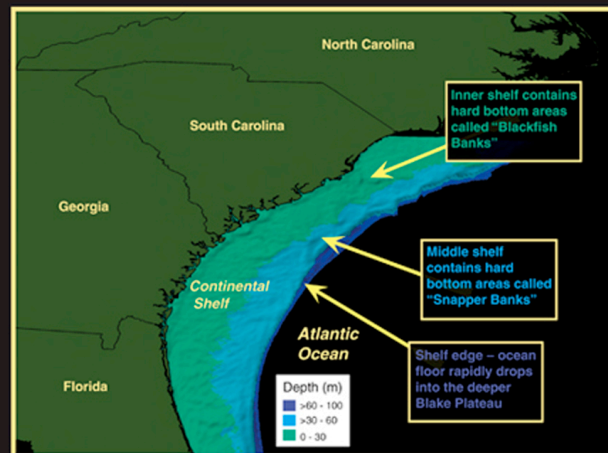
The brittle star (*Asteropora annulata*), an echinoderm found on deeper reefs

An underwater plain of sand, sometimes up to several feet deep, covers much of the continental shelf along the southeastern United States from Cape Hatteras, North Carolina to Cape Canaveral, Florida. Scattered within this expanse of unconsolidated or "soft" bottom substrate are areas that fishermen and scientists call "live" or "hard bottom".

Hard bottom areas provide important substrate for invertebrate animals such as sponges, corals, bryozoans and tunicates to attach themselves. In turn, the physical structure of these animals provides excellent habitat for other creatures like marine snails, crabs, sea urchins, and lobsters. Fish are also attracted to these areas, which is why recreational fishermen often search out hard bottom areas. The fish are drawn to hard bottom outcroppings because they are a source of food and shelter on what is otherwise a vast sandy sea floor.

A variety of rock types make up the outcroppings of the hard bottom reefs. Many are flat and composed of mixtures of limestone, shell and sand, quartz sandstone and cemented shell fragments. The hard bottom habitats off the southeastern coast of the US are usually of low to moderate relief (generally less than 2 m (6 ft) in height), yet they provide unique habitats for diverse communities of invertebrate and vertebrate species.

The physical nature of these outcroppings and the animals and plants they support are generally influenced by the depth gradient between the shore and the shelf break. Some species are widely distributed across the shelf, however, many are characteristically representative of one of three commonly recognized depth zones on the shelf: the inner shelf, the middle shelf, and the shelf edge or break.



Snapper Banks

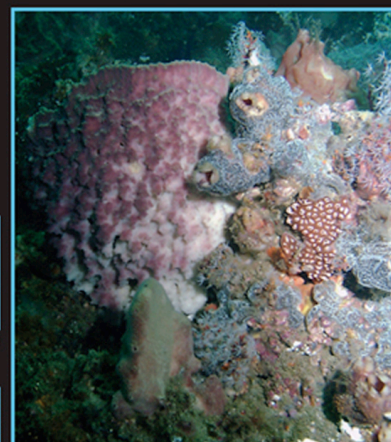
Further offshore, in waters of 30-45 m (98-148 ft), the "snapper banks" and other reefs occur. The bulk of biomass in this area is mainly composed of sponges and tunicates.



This regal sea fan (*Leptogorgia hebes*), a common octocoral found on the Snapper Banks, has associated amphipods that live on its surface.



Tubular horn bryozoan (*Schizoporella violacea*, left) is a colony composed of many small individual animals; the rope sponge (*Aplysina fulva*, right) is an animal with a very simple body plan and numerous pores. Both animals provide hiding spaces for small fish and invertebrates.



Large sponges and tunicates make up this higher relief middle shelf reef.



This group of encrusting organisms (cup corals, soft corals, tunicates, hydroids) is typical on hard bottom substrates, providing more physical complexity for other small organisms.



Cabrit's murex (*Haustorium cabritii*) is a carnivorous mollusk that feeds on clams and other bivalves.



The spineback hairy crab (*Pilumnus sayi*) often occupies small cracks and holes in the reef substrate.

Some threats to hard bottom habitats:

- The removal of sand at near shore localities for beach nourishment projects has the potential to damage hard bottom and decimate its inhabitants
- Dredging navigation channels in the near shore coastal region can damage or remove hard bottom structures, and disposal of dredged estuarine sediments can create turbidity plumes that smother or inhibit the growth of many sessile hard bottom animals
- Fishing gear can damage hard bottom communities as it is dragged repeatedly over productive fishing grounds. Trawling is now banned in the reef fish fishery.
- Overfishing of top-level predators can change community and structure of food webs on reefs.
- Other human impacts, such as storm water runoff and sewage spills, which increase nutrient levels, sediment loads and pollutant concentrations in the water column, can harm the inhabitants of near shore hard bottom areas



A brittle star on the pinnate spiny sea fan (*Muricea pendula*), a common shelf octocoral



Bathyal swimming crabs (*Bathynectes longispina*) and other crustaceans, such as this galatheid squat lobster, are common scavengers at the shelf edge. Despite the bright red color of the images here, these animals appear black in the deep, dark shelf edge waters.



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